

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Veröffentlichungsnummer: **0 254 950 B1**

(12)

## EUROPÄISCHE PATENTSCHRIFT

(45) Veröffentlichungstag der Patentschrift: 16.10.91

(51) Int. Cl.<sup>5</sup>: **C07C 69/54, C07C 271/06,  
A61K 6/08, C08F 20/28,  
C07C 67/08, C08G 18/10**

(21) Anmeldenummer: 87110144.0

(22) Anmeldetag: 14.07.87

(54) (Meth)-acrylsäureester.

(30) Priorität: 25.07.86 DE 3626203  
03.02.87 DE 3703080

(43) Veröffentlichungstag der Anmeldung:  
03.02.88 Patentblatt 88/05

(48) Bekanntmachung des Hinweises auf die  
Patenterteilung:  
16.10.91 Patentblatt 91/42

(94) Benannte Vertragsstaaten:  
**AT BE CH DE ES FR GB IT LI NL SE**

(56) Entgegenhaltungen:  
**BE-A- 664 445  
US-A- 4 250 322**

(73) Patentinhaber: **BAYER AG**

**W-5090 Leverkusen 1 Bayerwerk(DE)**

(72) Erfinder: **Reiners, Jürgen, Dr.  
Carl-Rumpff-Strasse 57  
W-5090 Leverkusen 1(DE)  
Erfinder: Podszun, Wolfgang, Dr.  
Wolfskaul 4  
W-5000 Koeln 80(DE)  
Erfinder: Winkel, Jens, Dr.  
Hahnenweg 6  
W-5000 Koeln 80(DE)**

**EP 0 254 950 B1**

Anmerkung: Innerhalb von neun Monaten nach der Bekanntmachung des Hinweises auf die Erteilung des europäischen Patents kann jedermann beim Europäischen Patentamt gegen das erteilte europäische Patent Einspruch einlegen. Der Einspruch ist schriftlich einzureichen und zu begründen. Er gilt erst als eingelegt, wenn die Einspruchsgebühr entrichtet worden ist (Art. 99(1) Europäisches Patentübereinkommen).

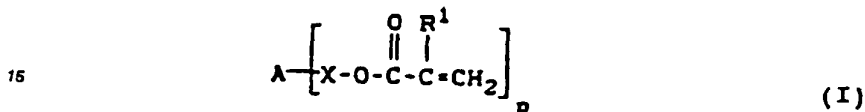
steht, gegebenenfalls in Abmischung mit Comonomeren, an sich bekannten Additiven und Füllstoffen, auf an sich bekannte Weise ausgehärtet werden.

2. Verfahren gemäß Anspruch 1, dadurch gekennzeichnet, daß es sich bei dem Dentalwerkstoff um einen künstlichen Zahn handelt.

#### Claims

Claims for the following Contracting States : AT, BE, CH, DE, FR, GB, IT, LI, NL, SE

1. Use of (meth)acrylic acid esters of the formula

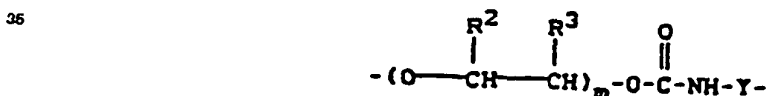


in which

- A is a straight-chain or branched aliphatic radical having 3 to 20 carbon atoms and optionally containing 1 or 2 oxygen bridges, an araliphatic radical having 7 to 26 carbon atoms or a cycloaliphatic radical having 6 to 28 carbon atoms,  
p represents the number of chains starting from A and denotes a number from 3 to 8,  
R<sup>1</sup> denotes hydrogen or methyl, independently for each chain starting from A, and  
X represents one of the radicals



or



wherein

- n denotes a number from 1 to 5, independently for each chain starting from A,  
m denotes a number from 0 to 5, independently for each chain starting from A,  
R<sup>2</sup> and R<sup>3</sup> denote hydrogen or hydrogen and methyl, and  
Y is a divalent, straight-chain or branched aliphatic radical which has 2 to 12 carbon atoms and can optionally contain 1 or 2 oxygen bridges,

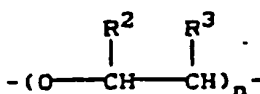
in dental materials.

2. Use according to Claim 1, characterised in that the (meth)acrylic acid esters are used in tooth-filling compositions.  
3. Use according to Claim 1, characterised in that the (meth)acrylic acid esters are used in coatings for teeth.  
4. Use according to Claim 1, characterised in that the (meth)acrylic acid esters are used for the preparation of plastic teeth.  
5. Use of (meth)acrylic acid esters of the formula (I)

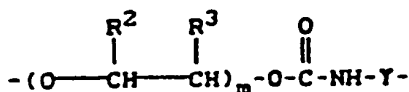


in which

- A is a straight-chain or branched aliphatic radical having 3 to 20 carbon atoms and optionally containing 1 or 2 oxygen bridges, an araliphatic radical having 7 to 26 carbon atoms or a cycloaliphatic radical having 6 to 26 carbon atoms,  
 p represents the number of chains starting from A and denotes a number from 3 to 6,  
 R<sup>1</sup> denotes hydrogen or methyl, independently for each chain starting from A, and  
 X represents one of the radicals



or



wherein

- n denotes a number from 1 to 5, independently for each chain starting from A,  
 m denotes a number from 0 to 5, independently for each chain starting from A,  
 R<sup>2</sup> and R<sup>3</sup> denote hydrogen or hydrogen and methyl, and  
 Y denotes a divalent, straight-chain or branched aliphatic radical which has 2 to 12 carbon atoms and can optionally contain 1 or 2 oxygen bridges,

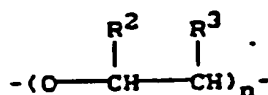
for the preparation of dental materials.

6. Dental materials, characterised in that they contain (meth)acrylic acid esters of the formula (I)

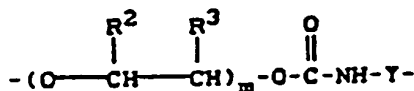


In which

- A is a straight-chain or branched aliphatic radical having 3 to 20 carbon atoms and optionally containing 1 or 2 oxygen bridges, an araliphatic radical having 7 to 26 carbon atoms or a cycloaliphatic radical having 6 to 26 carbon atoms,  
 p represents the number of chains starting from A and denotes a number from 3 to 6,  
 R<sup>1</sup> denotes hydrogen or methyl, independently for each chain starting from A, and  
 X represents one of the radicals



or



wherein

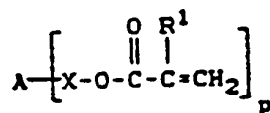
- n denotes a number from 1 to 5, independently for each chain starting from A,  
 m denotes a number from 0 to 5, independently for each chain starting from A,  
 R<sup>2</sup> and R<sup>3</sup> denote hydrogen or hydrogen and methyl, and  
 Y denotes a divalent, straight-chain or branched aliphatic radical which has 2 to 12 carbon atoms and can optionally contain 1 or 2 oxygen bridges.

7. Dental materials according to Claim 6, characterised in that they contain further comonomers in addition to (meth)acrylic acid esters of the formula I.

8. Dental materials according to Claims 6 and 7, characterised in that they contain (meth)acrylic acid esters of the formula (I), comonomers and additives known per se and optionally fillers.

#### Claims for the following Contracting State : ES

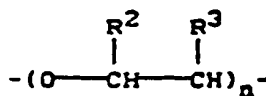
1. Process for the preparation of dental materials, characterised in that (meth)acrylic acid esters of the formula (I)



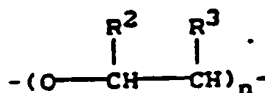
(I)

In which

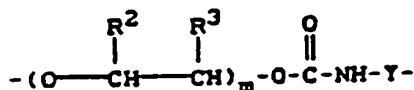
- A is a straight-chain or branched aliphatic radical having 3 to 20 carbon atoms and optionally containing 1 or 2 oxygen bridges, an araliphatic radical having 7 to 26 carbon atoms or a cycloaliphatic radical having 6 to 26 carbon atoms,  
 p represents the number of chains starting from A and denotes a number from 3 to 6,  
 R<sup>1</sup> denotes hydrogen or methyl, independently for each chain starting from A, and  
 X represents one of the radicals



or



or



wherein

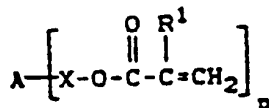
- n denotes a number from 1 to 5, independently for each chain starting from A,  
 m denotes a number from 0 to 5, independently for each chain starting from A,  
 R<sup>2</sup> and R<sup>3</sup> denote hydrogen or hydrogen and methyl, and  
 Y denotes a divalent, straight-chain or branched aliphatic radical which has 2 to 12 carbon atoms and can optionally contain 1 or 2 oxygen bridges.

7. Dental materials according to Claim 6, characterised in that they contain further comonomers in addition to (meth)acrylic acid esters of the formula I.

8. Dental materials according to Claims 6 and 7, characterised in that they contain (meth)acrylic acid esters of the formula (I), comonomers and additives known per se and optionally fillers.

#### Claims for the following Contracting State : ES

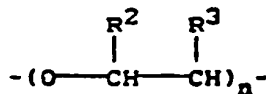
1. Process for the preparation of dental materials, characterised in that (meth)acrylic acid esters of the formula (I)



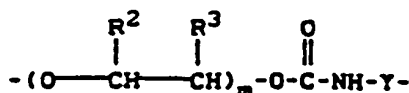
(I)

In which

- A is a straight-chain or branched aliphatic radical having 3 to 20 carbon atoms and optionally containing 1 or 2 oxygen bridges, an araliphatic radical having 7 to 26 carbon atoms or a cycloaliphatic radical having 6 to 26 carbon atoms,  
 p represents the number of chains starting from A and denotes a number from 3 to 6,  
 R<sup>1</sup> denotes hydrogen or methyl, independently for each chain starting from A, and  
 X represents one of the radicals



or



wherein

$n$  denotes a number from 1 to 5, independently for each chain starting from A,

$m$  denotes a number from 0 to 5, independently for each chain starting from A,

$R^2$  and  $R^3$  denote hydrogen or hydrogen and methyl, and

$Y$  is a divalent, straight-chain or branched aliphatic radical which has 2 to 12 carbon atoms and can optionally contain 1 or 2 oxygen bridges,

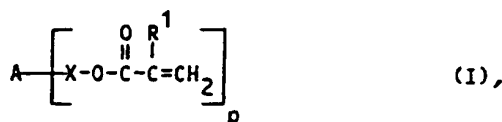
are cured in a manner known per se, if desired mixed with comonomers, additives known per se and fillers.

2. Process according to Claim 1, characterised in that the dental material is an artificial tooth.

#### Revendications

Revendications pour les Etats contractants suivants : AT, BE, CH, DE, FR, GB, IT, LI, NL, SE

1. Utilisation d'esters (méth)acryliques de formule (I)



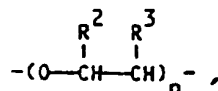
dans laquelle

A est un reste aliphatique à chaîne droite ou ramifiée en  $C_3$ - $C_{20}$ , contenant éventuellement 1 ou 2 ponts oxygène ou un reste araliphatique en  $C_7$ - $C_{26}$  ou un reste cycloaliphatique en  $C_6$ - $C_{26}$ ,

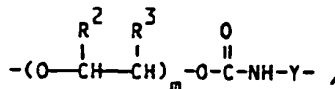
$p$  est le nombre des chaînes partant de A et représente un nombre de 3 à 6,

$R^1$  représente, indépendamment pour chaque chaîne partant de A, un atome d'hydrogène ou un groupe méthyle et

X représente l'un des restes



ou



dans lesquels

$n$  représente, indépendamment pour chaque chaîne partant de A, un nombre de 1 à 5,

$m$  représente, indépendamment pour chaque chaîne partant de A, un nombre de 0 à 5,

$R^2$  et  $R^3$  représentent l'hydrogène ou l'hydrogène et un groupe méthyle

$Y$  représente un reste aliphatique divalent à chaîne droite ou ramifiée en  $C_2$ - $C_{12}$ , qui peut contenir éventuellement 1 ou 2 ponts oxygène,